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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,579	01/31/2006	Takeshi Azami	Q92766	5131

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EXAMINER	
MICALI, JOSEPH	
ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
02/04/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/566,579	AZAMI ET AL.	
	Examiner	Art Unit	
	Joseph V. Micali	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5 and 10-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5 and 10-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Application

The argumentation filed on December 7th, 2009 has been entered. Claims 1, 3, 5, and 10-14 remain pending and presented for examination on the merits.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 3, 5, and 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Nano-aggregates of single-walled graphitic carbon nano-horns* by Iijima et al, in view of US Patent No. 6,878,360 by Ohsaki et al and US Patent No. 6,648,975 by Suzuki et al.

With respect to claims 1, 3, and 11, Iijima discloses a carbon nanohorn manufacturing apparatus, including:

a generation chamber which generates nanohorns;

a graphite target rod disposed in the generation chamber;

a light source which irradiates light onto a surface of the graphite target;

a collecting unit which recovers generated nanohorns through use of cylindrical filters;

a pumping line to guide the nanohorns into the recovery unit **(Section 2. Experimental)**.

However, Iijima is silent with regards to the moistening unit, nanocarbon plume floating/constant illuminating angle, and recovery chamber positioning.

Ohsaki is drawn to the production device of carbon fibrous matter. Specifically, Ohsaki discloses a recovery chamber (i.e. collecting means) in which a moistening unit is positioned, a moistening unit explicitly being a wet type spraying unit which sprays water or an organic liquid onto the carbon fibers **(column 13, lines 4-10)**.

At the time of invention it would have been obvious to a person of ordinary skill in the art to produce the apparatus of Iijima including the addition of a moistening unit to the recovery chamber, in view of the teaching of Ohsaki. The suggestion or motivation for doing so would have been to use a well-established type of collecting means to more efficiently collect the final nanocarbon product **(Ohsaki, column 13, lines 4-10)**.

Suzuki is drawn to a method and apparatus for the generation of ultra-fine particles. Specifically, Suzuki discloses a laser (205) entering a particle generating chamber (101), generating plume (208) from target (207), and pipe (209) used to collect the particles (**figure 6, and column 11, lines 19-57**). The arrangement of the laser is approximately forty-five degrees to the target. The arrangement of the pipe is approximately perpendicular to the target.

At the time of invention it would have been obvious to a person of ordinary skill in the art to produce the apparatus of Iijima and Ohsaki including the angling of the light source onto the target in generating a directed plume, in view of the teaching of Suzuki. The suggestion or motivation for doing so would have been to more efficiently collect the plume product from the generation chamber (**Suzuki, column 11, lines 43-48**).

With regards to the recover chamber positioning, Suzuki discloses how the plume is directed based off of the light source and constant illuminating angle on the target (i.e. graphite rod in the current case). Thus, a person having ordinary skill in the art at the time the invention was made would understand that if you wanted the light source to come in as a straight line (0°), given the constant illuminating angle and thus the generated plume's direction, the carrier pipe would have to be at the same angle to which the plume is extending toward (**column 11, lines 43-48**), and the recovery chamber would then be above the generation chamber. Essentially, one having ordinary skill in the art could simply look at **figure 6** tilted 90° counterclockwise. Hence, with the combination above, the nanocarbon plume would float through such a pipe at such an angle.

With respect to claim 5, Ohsaki discloses the moistening unit explicitly being a wet type spraying unit which sprays water or an organic liquid onto the carbon fibers (**column 13, lines 4-10**).

With respect to claim 10, Ohsaki teaches a recovery chamber with an inclined bottom face, specifically with the ejector chamber (**figures 1-3**). This aligns with applicant's purpose for such a claim limitation (**see applicant's figure 6**).

With respect to claim 12, Suzuki discloses the arrangement of the laser (i.e. light source) is approximately 45° to the target (**figure 6**); thus, a constant illuminating angle of about 45°.

With respect to claims 13 and 14, and specifically with regards to the recover chamber positioning, Suzuki discloses how the plume is directed based off of the light source and constant illuminating angle on the target (i.e. graphite rod in the current case). Thus, a person having ordinary skill in the art at the time the invention was made would understand that if you wanted the light source to come in as a straight line (0°), given the constant illuminating angle and thus the generated plume's direction, the carrier pipe would have to be at the same angle to which the plume is extending toward (**column 11, lines 43-48**), and the recovery chamber would then be above the generation chamber. Essentially, one having ordinary skill in the art could simply look at **figure 6** tilted 90° counterclockwise. Hence, with the combination above, the nanocarbon plume would float through such a pipe at such an angle.

Response to Arguments

5. Applicant's arguments filed on December 7th, 2009 have been fully considered but they are not persuasive.

Applicant's argumentation is based on the rejections using the combination of Iijima, Ohsaki, and Suzuki, chiefly on the reference of Ohsaki. Applicant agrees that Iijima, Suzuki, and the current application are all drawn to methods using laser ablation, and thus, are analogous art. Applicant goes on to discuss the merits of Suzuki even further, which the examiner agrees with. Ultimately, the issue is with Ohsaki, which does disclose a furnace methodology in which the carbon fibers fall downward into a collection means. However, this is no longer the examiner's point of combination, nor does that teaching of Ohsaki discredit its teaching of a moistening unit. Ohsaki is still drawn to the same field of endeavor as the other references as well as the current application. Furthermore, examiner has previously amended his rejection such that Ohsaki's presence is to show obviousness in the art to include a moistening unit, as Suzuki has previous been added to show the collecting means in a laser ablation setting. As the examiner maintains the use and suggestion or motivation of Ohsaki to provide a moistening unit, especially to one having ordinary skill in the art, examiner maintains the previous (repeated above) rejections. Finally, with regards to claim 14, examiner maintains the obviousness of such a claim, given the teaching of Suzuki and the ability of one having ordinary skill in the art at the time the invention was made.

Conclusion

6. Claims 1, 3, 5, and 10-14 are rejected.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph V. Micali whose telephone number is (571) 270-5906. The examiner can normally be reached on Monday through Friday, 7:30am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry A. Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joseph V Micali/
Examiner, Art Unit 1793

/J.A. LORENGO/
Supervisory Patent Examiner, Art Unit 1793